The Mediating Effect of Pain and Fatigue on Level of Functioning in Older Adults

Jill A. Bennett • Anita L. Stewart • Jeanie Kayser-Jones • Dale Glaser

Background: Medical conditions and symptoms have been shown to predict level of functioning in older adults, but med-
ical conditions and symptoms have only been investigated to-
gether in a comprehensive model that included both med-
ical conditions and symptoms as predictors of functioning in
older adults.

Objective: The purpose of this study was to determine whether
the adverse effect of medical conditions on different aspects
of functioning in older adults is mediated by the level of
symptoms (pain and fatigue). If so, level of functioning may
improve if pain or fatigue can be mitigated, even when un-
derlying medical conditions cannot be cured.

Method: Data from 225 adults aged 65-80 were used to test
whether medical conditions, symptoms (pain and fatigue), and
six constitutive predictors lower body performance, self-
reported physical functioning, and self-reported role and
social functioning. The fit of a series of models to the data
was analyzed using structural equation modeling.

Results: Medical conditions affected self-reported physical
functioning and self-reported role and social functioning by
increasing the level of symptoms, rather than by direct asso-
ciation. Further descriptive studies are needed to identify
other symptoms and modifiable mechanisms by which med-
ical conditions affect functioning. Researchers who investi-
gate the causes of poor functioning in older adults are
encouraged to include symptoms in models that hypothesize
medical conditions as predictors of functioning outcomes.

Key Words: activities of daily living • aged • fatigue • pain

Adults over age 65 comprise a rapidly growing segment
of the United States population (Schneider, 1999; U.S.
Bureau of the Census, 1995). Today, nearly 6.6 million peo-
ple over the age of 65 receive help with daily activities, and
the number of elders who need help will continue to increase
as the population grows (Kassner & Beetel, 1998). It will
become increasingly important for nurses and other health-
care providers to prevent disability in elders whenever pos-
sible. To provide the best preventive care, it is necessary to
(a) understand the reasons why older adults limit their per-
formance of daily tasks and activities; and (b) identify the
modifiable factors that lead to disability.

The presence of medical conditions is a key predictor of
functional limitations in older adults (Craso, Silliman, DeMistie,
Greenfield, & Wagner, 2000; Nagi, 1976; Rozzini et al., 1997;
Verhuyge & Jette, 1994). However, this knowledge has limited utility for planning interven-
tions to improve functioning because many medical condi-
tions cannot be cured. Some researchers have suggested
that it is not the diseases per se that affect functioning, but
their manifestations, such as symptoms (Stewart & Painter,
1998). If this is correct, level of functioning may improve if symptoms can be mitigated. The role of symp-
toms as an independent predictor of level of functioning in
older adults has been established (Craso et al., 2000;
Strawbridge, Cohen, Shema, & Kaplan, 1996), but we are
unaware of any studies that have explored the relation-
ships between medical conditions, symptoms, and func-
tioning in a single comprehensive model.

The purpose of this study was to determine whether
the adverse effect of medical conditions on different
aspects of functioning in older adults was mediated by
two symptoms: pain and fatigue. Pain and fatigue are
common symptoms that result from a variety of medical
conditions in older adults (Hickie et al., 1996; Karlsson,
Larsson, Tandberg, & Jorgensen, 1999; Liao & Ferrell,
2000; Won et al., 1999), and both are often undertreated
(Liao & Ferrell, 2000; Lichtston, Mezen, Noe, & Aguil-
ier, 1997; Morrison & Siu, 2000). If pain and fatigue
play an important mediating role in the association
between medical conditions and functioning, it is possible

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that interventions to reduce these symptoms may improve mobility and performance of activities of daily living (ADL) in older adults.

To investigate if pain and fatigue mediated the relationship between medical conditions and functioning in older adults, a theoretical model of the disability pathway was tested where these aspects of functioning were hypothesized to represent a sequence of functional decline. Decline occurs first in lower body function, followed by self-reported physical functioning, followed by self-reported role and social functioning (Nagi, 1976; Stewart & Painter, 1998; Verbrugge & Jette, 1994). The sequence of functional decline has been demonstrated empirically in longitudinal studies (Guralnik et al., 2000; Guralnik, Ferrucci, Simonsick, Salive, & Wallace, 1995).

Methods

Participants

This study used cross-sectional baseline data from older adults (aged 65 and over) who enrolled in either a randomized trial of the Community Healthy Activities Model Program for Seniors (CHAMPS II) (Stewart, Verbrugge, et al., 2001) or a parallel active cohort. CHAMPS was a physical activity promotion program designed to increase lifetime physical activity levels of older adults. Individuals from two Medicare HMOs within a large multisite practice were enrolled between January and June 1996. The CHAMPS trial cohort included persons who were sedentary or underactive and had no serious medical conditions that could limit participation in light to moderate physical activity (e.g., unstable angina, uncontrolled hypertension, type 1 diabetes, or recent chest pain, heart attack, heart surgery). An active cohort included persons who had engaged in moderate-intensity physical activity during the last three months at least three times weekly. Baseline data from both groups were used in this study. All methods were approved by the appropriate institutional Review Boards.

Independent Variables

Medical conditions. Medical conditions were measured by the sum of eight self-reported medical conditions or syndromes: (a) arthritis or joint problems; (b) osteoporosis; (c) kidney or liver disease; (d) asthma, chronic bronchitis, or emphysema; (e) hypertension; (f) diabetes; (g) congestive heart failure or heart trouble; and (h) paralysis, stroke, Parkinson’s, or other neurological problems.

Symptoms. Symptoms were measured as a latent variable by two causal indicators, the pain scale with the energy/fatigue scale of the SF-36 (McHorney, Ware, & Raczek, 1993). The indicators were conceptualized as causal because pain and fatigue predict symptom status, rather than the reverse. This relationship is different from the more common relationship between latent variable and “effect” indicator, in which the latent variable predicts the values of the indicators. The SF-36 scale scores were transformed to 0–100 scale. For model testing, the values were derived from the usual SF-36 scoring so high scores represented more pain or fatigue. The internal consistency reliabilities of the pain and fatigue/energy scales in the current study were both .73.

Covariates

Obesity. Obesity was measured to a Body Mass Index (BMI) of 29 or more, a categorization that is consistent with other studies of functioning in older adults (Galassi, Perper, Cormier-Hunter, Bales, & Plichta-Buchan, 1994). Body Mass Index was calculated from self-reported weight in kilograms divided by height in meters squared. Age, sex, and sex were each measured by single self-reported items.

Socioeconomic status. Socioeconomic status was measured by two items: (a) income, a three-level ordinal item and (b) education, a six-level ordinal item. These variables were designated as causal indicators in the model, rather than the usual effect indicators used in structural equation modeling because logical, income and education predict socioeconomic status rather than the reverse.

Exercise capacity. Exercise capacity was measured by a six-minute walk, in which the subject walked around a course marked by traffic cones for six minutes. Participants were instructed to walk at a pace that allowed them to comfortably talk without being short of breath. They could stop and rest, but the stopwatch continued to run during rest periods. The distance walked was measured in feet; longer distances indicate better exercise capacity. The six-minute walk is considered a valid and reproducible test of exercise capacity based on correlations with other fitness and exercise capacity measures (e.g., cycle ergometry, peak oxygen consumption during exercise, spirometry) (Langenberg et al., 1990; Stens, 1996).

Physical activity. Physical activity was measured by the CHAMPS Physical Activity Questionnaire, a self-report instrument designed to measure level of physical activity in older adults (Stewart, Milis, King, Haskell, Gillis, & Ritter, 2001). The measure used for this study requested calories expended per week in a variety of physical activities typically performed by older adults for exercise (e.g., walking briskly, swimming, general conditioning, stretching, gardening). Higher scores indicate more calorie expenditure and thus higher levels of physical activity. Evidence of the construct validity of this measure has been reported (Stewart, Milis, et al., 2001).

Dependent Variables

Lower body performance. Lower body performance was measured by the Physical Performance Battery (PPB) developed for the Established Populations for Epidemiologic Studies of the Elderly (EPESE). The PPB produces a summary ordinal score based on three performance tests: (a) tandem stand, (b) chair rise-and-and, and (c) 8-foot walk. In previous studies, the PPB has been associated with self-reported physical functioning, mortality, and rising home admissions (Guralnik et al., 1993; Guralnik et al., 1994). Scores on the PPB range from 0–12, with higher scores indicating better lower body performance.

Self-reported physical functioning. Self-reported physical functioning was measured by the SF-36 physical functioning scale (McHorney et al., 1993), which assesses the extent to which health limits physical activities (e.g., self-care, walking, climbing hills and stairs, bending, lifting, moderate and vigorous activities). The scale score was transformed to 0–100, with higher scores representing bet-
More than 90% rated their health as very good or excellent.

Five fit indices were selected to evaluate the fit of each model to the data. Two indices, chi-square and the goodness-of-fit index (GFI), are measures of absolute fit indicating how well the parameters in the model match the covariances in the data. A small, nonsignificant chi-square indicates a good model fit. The GFI measures the proportion of observed covariances explained by the model. The GFI is analogous to an R² statistic in multiple regression and a value close to 1 indicates good model fit.

Two fit indices, the nonnormed fit index (NNFI) and the comparative fit index (CFI), evaluate incremental fit by comparing the model being tested to a null model. Good fit is indicated by a value over 0.9 (Hu & Bentler, 1995). This means the tested model fits the data 90% better than a model that does not fit at all. Another fit index used in this analysis was the root mean square error of approximation (RMSEA), which evaluates model fit in relation to the number of pathways estimated. A RMSEA below 0.05 indicates a good model fit in relation to the number of pathways estimated (Hu & Bentler, 1995).

Results

Of the 249 people in the two cohorts of the CHAMPS study, 223 (90%) had complete data on all measures. Samples larger than 200 are generally considered adequate for analysis of structural equation models (Kline, 1998).

The 223 participants were aged 65-90. More than 90% rated their health as very good or excellent, with a mean of 1.5 medical conditions. Approximately 90% reported their ethnicity as non-Hispanic White. The participants had high levels of education (66.2% had a college degree or higher). The demographic characteristics of the 24 participants who were excluded from this analysis were consistent with those of the 225 who were included, using t-tests for continuous variables and chi-square tests for categorical variables. As shown in Table 1, the groups were similar in most characteristics, though the excluded participants had higher levels of education. Only eight excluded participants reported some, too few to allow a comparison between the groups.

The mean scores in the sample on the dependent functioning variables and the key independent variable (medical conditions, pain, fatigue) were presented in Table 2. In the current study, the mean score on the SF-36 physical functioning scale was 96.5 points higher than the general population norm for adults aged 65-74, and the mean score of the social functioning scale was 11.7 points higher than the general population norm for adults aged 65-74.
<table>
<thead>
<tr>
<th>Variables</th>
<th>Excluded % or Mean (SD, N = 24)</th>
<th>Included % or Mean (SD, N = 225)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>73.8 (5.7)</td>
<td>71.1 (5.6)</td>
<td>.86 (1-tailed)</td>
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<tr>
<td>Female</td>
<td>70.8%</td>
<td>63.1%</td>
<td>.48 (2-tailed)</td>
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<tr>
<td>Number of medical condition</td>
<td>1.50 (1.29)</td>
<td>1.48 (1.16)</td>
<td>.92 (2-tailed)</td>
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<tr>
<td>Education beyond high school</td>
<td>71.6%</td>
<td>84%</td>
<td>&lt;.01 (2-tailed)</td>
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<td>BMI</td>
<td>25.31 (9.95)</td>
<td>24.00 (4.40)</td>
<td>.87 (2-tailed)</td>
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<tr>
<td>Exercise capacity (mean distance in feet for exercise walk)</td>
<td>1,488.24 (262.24)</td>
<td>1,488.56 (380.81)</td>
<td>.37 (1-tailed)</td>
</tr>
<tr>
<td>Physical activity (mean calories expended (\leq) at activities per week)</td>
<td>2,889.23 (2,243.22)</td>
<td>2,386.11 (1,754.81)</td>
<td>.21 (1-tailed)</td>
</tr>
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</table>

Note: SD = standard deviation; BMI = body mass index; t-tests were used to compare means of continuous variables and chi-square tests were used to compare categorical variables.

(Ware, 1998). A larger percentage of participants in the current study received the highest score, 12, on the physical performance battery than did a representative population aged 75 from the 4-site EPFSE study (Guralnik et al., 2000), though scores ranged from a low of 1 to a high of 12 in the current study.

The distribution of each variable was examined to assess normality. Though some individual variables were skewed or Kurtotic, none was outside the limits of normality (skew \(>2\) or variances \(>7\)) (Kline, 1999) and there were no outliers. Table 3 presents the correlation matrix for the variables in the model. All correlations were in the

<table>
<thead>
<tr>
<th>Variable Measure (Range)</th>
<th>Range</th>
<th>Mean (SD)</th>
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<tbody>
<tr>
<td>Medical conditions</td>
<td></td>
<td>1.48 (1.96)</td>
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<tr>
<td>Sum of medical conditions (0-8)</td>
<td></td>
<td>28.00 (22.52)</td>
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<tr>
<td>Symptoms</td>
<td></td>
<td>35.34 (21.34)</td>
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<td>SF-36 pain scale (0-100)</td>
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<td>10-100</td>
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<td>SF-36 physical functioning scale (0-100)</td>
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<td>SF-36 physical functioning (0-100)</td>
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<td>SF-36 role-physical scale (0-100)</td>
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<td>SF-36 social functioning (0-100)</td>
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<td>SF-36 social functioning (0-100)</td>
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Note: SF-36 = Medical Outcomes Study Short Form 36 (with survey).
<table>
<thead>
<tr>
<th>Lower Body Performance</th>
<th>Physical Functioning</th>
<th>Role Activities</th>
<th>Social Activities</th>
<th>Medical Conditions</th>
<th>Pain (reversed)</th>
<th>Fatigue (reversed)</th>
<th>Obesity (1 = obese)</th>
<th>Sex (1 = female)</th>
<th>Income (6 categ.)</th>
<th>Education (6 categ.)</th>
<th>Exercise Capacity</th>
<th>Physical Activity</th>
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<tr>
<td>Lower body performance</td>
<td>9.71 (2.72)</td>
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<tr>
<td>Physical functioning</td>
<td>.56** (70.04)</td>
<td>.54** (65.09)</td>
<td>.59** (92.28)</td>
<td>- .34** (.48)</td>
<td>- .45** (.48)</td>
<td>- .36** (.48)</td>
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<td>Role activities</td>
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<td>Medical conditions</td>
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<tr>
<td>Age</td>
<td>- .40** (-18)</td>
<td>- .18** (-18)</td>
<td>.01</td>
<td>.19** (.09)</td>
<td>.16</td>
<td>- .16 (-16)</td>
<td>74.07 (5.59)</td>
<td></td>
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<tr>
<td>Sex (1 = female)</td>
<td>- .22** (-23)</td>
<td>- .19** (-12)</td>
<td>- .12</td>
<td>- .02 (-02)</td>
<td>.07</td>
<td>.16 (.01)</td>
<td>.06 (.06)</td>
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<tr>
<td>Income (3 categ.)</td>
<td>.28** (.29)</td>
<td>.19** (.18)</td>
<td>- .14** (-12)</td>
<td>- .20 (-20)</td>
<td>- .03 (-03)</td>
<td>- .28 (-28)</td>
<td>2.24 (2.23)</td>
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<tr>
<td>Education (6 categ.)</td>
<td>.23** (.18)</td>
<td>.12 (-11)</td>
<td>.10</td>
<td>- .09 (-13)</td>
<td>- .11 (-11)</td>
<td>- .06 (-19)</td>
<td>4.10 (4.12)</td>
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<tr>
<td>Exercise capacity</td>
<td>.57** (.69)</td>
<td>.46** (.32)</td>
<td>- .39** (-.40)</td>
<td>- .44** (-.44)</td>
<td>- .20** (-.20)</td>
<td>- .37** (-.37)</td>
<td>.26** (.26)</td>
<td>.28** (3.80)</td>
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<tr>
<td>Physical activity</td>
<td>.27** (.23)</td>
<td>.15** (.07)</td>
<td>- .05 (-.05)</td>
<td>- .03 (-.03)</td>
<td>- .19 (-.24)</td>
<td>.17** (.17)</td>
<td>.22** (2.23)</td>
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Note. dichot. = dichotomous; categ. = categories
*p < .05 (two-tailed); **p < .01 (two-tailed)
expected direction and there was no multicollinearity between exogenous variables (highest $r = .47$). The four measures of the dependent functioning variables were significantly, but moderately, correlated (ranging from $.26$ to $.64$).

The fit of the initial theoretical model (Figure 1) was poor, as shown by the significant Chi-square and other fit indices. The lack of significant associations between lower body performance and the independent variables of medical conditions, pain, and fatigue suggested that further testing of pathways that were supported in the literature might generate a model that fits the data better. An interim structural equation model without pain and fatigue, shown in Figure 2, fit the data well. This model showed that more medical conditions were directly associated with lower self-reported physical functioning and lower self-reported role and social functioning. When pain and fatigue were added to the model as exogenous variables (Figure 3), model fit was similar, but associations within the model changed. In this model, more pain and more fatigue were associated with lower levels of self-reported physical functioning and lower self-reported role and social functioning, but the number of medical conditions had only a weak association (standardized path coefficient $<.10$) with the self-reported functioning variables. Because the direct relationships between medical conditions and self-reported physical functioning and self-reported role and social functioning changed from moderate to small when pain and fatigue were added to the interim model, the interim models suggested that pain and fatigue were mediators in the model. The mediating effect was tested in the final model.

The final model (Figure 4) included a latent variable for symptoms, measured by pain and fatigue, as a mediator in the relationship between medical conditions and self-reported physical functioning.
reported physical functioning and self-reported role and social functioning. The fit of the final model was good, and the path coefficients for medical conditions and symptoms were strongest in this model. Medical conditions were only weakly related to any functioning variable (standardized path coefficients <.10). Instead, medical conditions were moderately associated with symptoms, which, in turn, were strongly associated with self-reported physical functioning and self-reported role and social functioning.

In the final model, obesity was associated with poor self-reported physical functioning. Older age was associated with poorer lower body performance. Higher levels of exercise capacity and physical activity were associated with better lower body performance and self-reported physical functioning. In the final model, the association between lower body performance and self-reported physical functioning was small (standardized path coefficient <.10) and the association between self-reported physical functioning and self-reported role and social functioning was moderate (.23).

Discussion
In this analysis of cross-sectional data from a sample of community-living older adults, the best model fit was obtained when symptoms (pain and fatigue) were tested as mediators of the relationship between medical conditions and self-reported physical functioning; and between medical conditions and self-reported role and social functioning. In this model, there was only a small direct association (standard-
The path coefficients are standardized. Paths with coefficients < .10 are not shown. SF-36 Pain and Fatigue scores were reversed so a higher score indicates a higher level of pain or fatigue. RMSEA = root mean square error of approximation.

Our finding that pain and fatigue resulting from medical conditions were strongly associated with lower levels of self-reported physical functioning and self-reported role and social functioning, suggests that modifiable mechanisms, such as pain and fatigue, are more important in determining whether an older adult functions independently than are medical conditions, which often cannot be modified. Pain and fatigue are common in older adults for a variety of reasons, such as changes in sleep patterns and the presence of some medical conditions, including arthritis (Hickie et al., 1996; Liao & Ferrell, 2000). To our knowledge, our study is the first to report the relationship of pain, fatigue, and medical conditions in a comprehensive model of functioning in older adults. Earlier studies have reported that pain and fatigue were associated with poor functioning, without medical conditions as a covariate (Hickie et al., 1996; Karlson et al., 1999; Liao & Ferrell, 2000; Won et al., 1999) or that medical conditions were associated with poor functioning without symptoms as a covariate (Fried, Baumgart-Roche, Kasper, & Gurvichik, 1999). Other symptoms (e.g., shortness of breath or depressive symptoms) may also mediate the relationship between medical conditions and functioning. Further studies of other symptoms and mechanisms, such as medications or stress, may increase our understanding of potentially modifiable factors that may mediate the relationship between medical conditions and functioning in older adults.
The findings reported here relied on a summary score of medical conditions. It is possible that some medical conditions cause symptoms that influence level of functioning, while other medical conditions do not. Future studies with larger numbers of participants with each medical condition may disentangle the specific medical conditions and related symptoms that are most likely to negatively affect functioning in older adults. The relatively healthy older adults in this study reported a mean of 1.3 medical conditions. The somewhat small relationship between medical conditions and symptoms in the final model (standardized path coefficient = .15) suggests that the pain and fatigue in this sample may have been partially caused by other factors, but the strong associations between symptoms and self-reported physical functioning (standardized path coefficient = -.50) and self-reported role and social functioning (standardized path coefficient = -.73) clearly demonstrate the importance of pain and fatigue as predictors of functioning. Further research in older adults with more medical conditions is needed to confirm that most of the association between medical conditions and functioning is mediated by pain and fatigue in frail elders. Meanwhile, our findings support the importance of including pain and fatigue, which are often under-treated (Liao & Ferrell, 2000; Lichstein et al., 1997; Morison & Sia, 2000), as part of functional assessment.

Our model included covariates that have been reported as predictors of level of functioning in older adults. Though others have found that female sex (Smith & Baltes, 1998) and low level of education (Maddox et al., 1994) predicted lower levels of functioning, our data did not show these relationships. Our result may be due to the...
limited variability in level of education in our sample. Earlier findings that (a) obesity (Galanos et al., 1994), (b) older age (Becker et al., 1996), (c) lower exercise capacity (Guyatt et al., 1983), and (d) lower physical activity level (Etinger et al., 1997; Fries et al., 1994; Seeman et al., 1995) were associated with a reduced level of functioning in older adults were confirmed.

Many earlier studies did not measure or report on three separate aspects of functioning. It is important for future studies to distinguish the different conceptual aspects of functioning, because in our sample, age, obesity, exercise capacity, and physical activity affected some aspects of functioning and not others (Figure 4). For example, exercise capacity had a strong association with both lower body performance and self-reported physical function, yet the role and social functioning latent variable was not affected. Physical activity showed similar, albeit weaker, relationships with the three functioning variables. These findings support the theoretical model that difficulty in physical functioning, both performance and self-report, may precede difficulty in role and social functioning. Though additional studies that measure all three aspects of functioning are needed to confirm the specific relationships in our model, the results demonstrate the importance of considering the three conceptual aspects of functioning as outcomes in studies of older adults.

The three functioning variables in the model had significant intercorrelations (ρ < .01), and they were strongly associated in the initial theoretical model (Figure 1). However, in subsequent models with better fit to the data, the association between the three aspects of functioning weakened. In the final model, the association between lower body performance and self-reported physical functioning was small (standardized path coefficient <.10). The reduction in the associations between the functioning variables can be explained by the shared causes of all functioning variables. For example, exercise capacity and physical activity each predicted both lower body performance and self-reported physical functioning; obesity, medical conditions, pain, and fatigue were more likely to affect self-reported functioning than lower body performance. This raises an intriguing question for future research; perhaps obesity, medical conditions, pain, and fatigue make older adults more susceptible to functioning difficulties.

The common aspects of our findings may be limited by the homogeneity of our sample. Most of the participants were White, well-educated, and reported their health as good or excellent. Though our sample cannot represent all older adults, our model is a first step toward a better understanding of the factors that lead to functioning decline in healthy older adults. Further studies are needed in older adults of different ethnicities and in those in poor health.

The model-generating approach of our structural equation modeling analysis has the potential to capitalize on the joys of intervention for samples. Pathways selected for inclusion were based on evidence in the literature, thus, the model represents plausible relationships, though the model fit should be stated in other samples. The data in this study were cross-sectional, so causal relationships cannot be proved by our structural equation modeling analysis. However, causal relationships are implied between many variables in our model. For example, pain and fatigue are likely to cause declines in function rather than the reverse. Likewise, advancing age is likely to cause declines in lower body performance because the reverse cannot be true. Other relationships are more ambiguous and causal relationships can be assumed based on prior longitudinal studies. For example, our model shows that low levels of physical activity lead to poor lower body performance and self-reported difficulty in physical functioning, and is supported by reports in the literature (Etinger et al., 1997; Fries et al., 1994; Seeman et al., 1995). It is possible that the association goes the other way; poor performance and difficulty in functioning lead to lower levels of physical activity. It is not possible to explore the possibility with cross-sectional data.

It is encouraging that even though chronic medical conditions predict poor functioning, chronicity of the relationship is explained by the presence of pain and fatigue, which may be amenable to interventions. If symptoms, or other modifiable mechanisms, are important to maintaining or improving functioning in older adults, then methods to measure these mechanisms and interventions to mitigate their adverse effects on functioning may improve the quality of life of older adults, even if the underlying medical conditions remain unchanged. Though descriptive studies may lead to a better understanding of the relationship between medical conditions and level of functioning in older adults, the findings must be confirmed by experimental or longitudinal studies that test whether symptom management improves functioning in older adults.
References


